

REMARKS

Claims 1-14 are currently pending and claims 15-20 have been withdrawn from consideration. In the Office Action, the Examiner has rejected Claims 1, 3, 4-6, and 8-13 under 35 USC 102(b) as anticipated by Chiang; has rejected Claims 1 and 3 under 35 USC 102(b) as anticipated by Summerfelt; and has rejected Claims 7 and 14 under 35 USC 103 as unpatentable over Chiang.

Applicants first request clarification as to the status of Claim 2. From the listing of claims, it appears that Claim 2 has not been expressly rejected; however, Claim 2 is mentioned generally on page 3 of the Office Action. Applicants also note that the objection to the drawings has not been repeated. Applicants request confirmation that the objection to the drawings, for not depicting each and every feature of the invention as specified in Claim 9, has been withdrawn.

The present invention is directed to a semiconductor structure comprising a substrate; two or more adjacent conductors, disposed in at least one dielectric layer formed over the substrate and electrically isolated from each other, wherein each pair of adjacent conductors is separated by a gap; and a first high dielectric constant material which fills the gap

Y0999-420

between two adjacent conductors. Applicants had expressly defined the term "high dielectric constant material" in the Specification at page 1 and again on page 9. The detail provided on page 9, lines 2-14 explicitly states that a high dielectric constant material is one which has a dielectric constant that is greater than or equal to 10, and which is, accordingly, 2-3 times higher than that of conventional oxides. Not only is "high dielectric constant material" defined in terms of the absolute dielectric value, but it is also expressly distinguished from "conventional oxides" which include SiO₂. In addition, the present structure is expressly described and claimed such that paired conductors are disposed in a dielectric layer and are separated by a gap which is filled with a first high dielectric constant material. Applicants respectfully contend that that two dielectric materials (the layer material and the first high dielectric constant material) are separately claimed and are clearly not the same material. Nonetheless, Applicants have submitted an amendment to Claim 1 to highlight the fact that the high dielectric constant material which fills the gap between adjacent paired conductors is different from the material of the dielectric layer in which the conductors are disposed, and that the high dielectric constant material in the gap has a dielectric constant which is greater than that of the material in the dielectric layer. Applicants note that the claim language

already clearly recited that the high dielectric constant material *fills* the gap, and is not simply found in the gap.

The Examiner has rejected Claims 1, 3-6, and 8-13 as anticipated by the Chiang patent. The Chiang patent describes a structure having conductors formed in dielectric layer 50, specifically an SiO₂ layer, wherein the conductors are separated by layer 50 as well. Applicants again refer to the language of the present Specification which clearly teaches that that material which is used by the present invention to fill the gap between adjacent paired conductors is a high dielectric constant material having a dielectric constant which is ≥ 10 , and is 2-3 times higher than that of SiO₂, a "conventional oxide". While the Examiner cites the Liou patent publication (paragraph 0007) for its statement that SiO₂ has a "relatively high" dielectric constant of 3.9-4.5, the teachings found in the Liou patent publication simply serve to support Applicants' contention that a high dielectric constant material has a dielectric constant which is 2-3 times that of the conventional oxides. Applicants note that the Applicants' definition and use of the term "high dielectric constant", as opposed to constants for materials SiO₂ and Si₃N₄ which are less than 10, is also supported by the Summerfelt patent (see: Col. 1, lines 38-39).

YO999-420

9

Applicants respectfully assert that the Chiang patent does not anticipate the claimed invention since the Chiang patent does not teach or suggest a structure as claimed having a substrate; two or more adjacent conductors, disposed in at least one dielectric layer formed over said substrate and electrically isolated from each other, wherein each pair of adjacent conductors is separated by a gap; and a first high dielectric constant material filling the gap between two adjacent conductors, said first high dielectric constant material being a different material from and having a higher dielectric constant than said at least one dielectric. Chiang does not teach or suggest two different dielectric materials and does not teach or suggest that a high dielectric material be disposed to fill a gap between adjacent paired conductors.

It is well established under U. S. Patent Law that, for a reference to anticipate claim language under 35 USC 102, that reference must teach each and every claim feature. Since the Chiang patent does not teach or suggest a structure having a first high dielectric constant material filling a gap between adjacent conductors which are disposed in a dielectric layer, wherein the first high dielectric constant material is a different material from and has a higher dielectric constant than said at least one dielectric, it cannot be maintained that the Chiang patent anticipates the invention as claimed.

YO999-420

10

The Examiner has also rejected Claims 1 and 3 as anticipated by the Summerfelt patent. The Summerfelt patent is directed to a method whereby a sacrificial oxygen source is provided to protect underlying materials during processing. Summerfelt illustrates a structure having two conductors which are formed over a substrate and which have a gap therebetween. In the gap between the conductors and on the surfaces adjacent to the conductors, Summerfelt provides layers of dielectric (specifically the perovskite barium strontium titanate layer 46), electrode metal (platinum 48) and the oxide (PtO₂ layer 50). Applicants respectfully assert that the Summerfelt layering of dielectric, metal and oxide in the gap between and surrounding the exposed surfaces of the conductors, does not anticipate the invention as claimed. Summerfelt does not fill the gap between conductors with a high dielectric constant material. Rather, Summerfelt "fills" the gap, and surrounds the conductors, with multiple materials. Moreover, the net dielectric constant of the filled gap would certainly not be a high dielectric constant, since the electrode metal (i.e., a conductor) is disposed in the gap. Clearly Summerfelt is not teaching a structure with the gap fill material as claimed. Furthermore, since Summerfelt illustrates that the multiple fill materials also be disposed at the outer edges of and above the conductors, the dielectric layer in which the conductors are disposed and the fill material are the same, unlike the structure as expressly claimed.

YO999-420

11

Applicants again remind the Examiner that anticipation cannot be sustained under 35 USC 102(b) unless the reference teaches each and every claim feature. Since the Summerfelt patent does not teach a semiconductor structure comprising a substrate; two or more adjacent conductors, disposed in at least one dielectric layer formed over said substrate and electrically isolated from each other, wherein each pair of adjacent conductors is separated by a gap; and a first high dielectric constant material *filling* the gap between two adjacent conductors, said first high dielectric constant material being a different material from and having a higher dielectric constant than said at least one dielectric, it cannot be concluded that the Summerfelt patent anticipates the invention as claimed.

With regard to the obviousness rejections based on the Chiang patent, Applicants rely on the arguments presented above with respect to the teachings of the Chiang patent. Applicants further assert that even if one were to attempt to modify Chiang with the "obvious" power supply and ground lines of the Lee patent, one would not arrive at the invention as claimed, since one would not have any teaching or suggestion of a high dielectric constant material filling the gap between two adjacent conductors which are disposed in a dielectric material which is different from the gap fill material and which has a lower dielectric constant than the gap fill material. Absent some

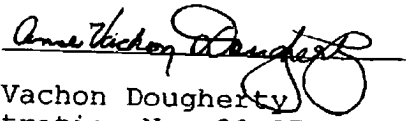
Y0999-420

teaching or suggestion, an obviousness rejection cannot be sustained.

Based on the foregoing, Applicants respectfully request entry of the amendments, clarification of the rejections, confirmation of withdrawal of the previous objections, withdrawal of the rejections, and issuance of the claims.

Respectfully submitted,

H.H. Chen, et al

By: 
Anne Vachon Dougherty
Registration No. 30,374
Tel. (914) 962-5910